CHAPTER III

LAND USE AND MORPHOLOGICAL CHARACTER

Urban land use is highly complex and it is more complex in a hilly town. Land use may be defined as human activity or development which occupies land. It refers to a piece or parcel of land used for a particular type of functional activity like residential, commercial, industrial, etc. In this way each parcel of land accommodates a specific function. As the town grows, certain forms of land use and buildings became segregated while others are brought together in close association. Land use is defined by the nature of terrain over which each plot of land occurs. On the other hand, the pattern and arrangement of the urban land use is influenced by the size, the function and the regional dominance of the town.

The land use maps of the town have been prepared on the basis of two different sets of base maps -namely the Cadastral map (from Survey and Settlement Deptt.) and the Bazar map (from Local Self Govt.Deptt.). The cadastral maps were originally prepared between 1976 and 1980. These maps were prepared in 1976-77 for towns like Gyalshing and Mangan, in 1977-78 Gangtok and in 1978-79 Nayabazar. For towns like Jorethang and Namchi they were prepared in 1979-80. The bazar maps of Rangpo and Singtham were prepared.

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1 Govda, KSR. Land use Pattern in Urban Areas. In (Symposium on Urban Land Use, 21st International Geographical Congress India, Calcutta, National Committee for Geography, 1972, p 47)

red by the Local Self Govt. Department in 1976-77 and 1981-82 respectively. There are altogether 44 cadastral sheets (1:1000) recording more than 4,000 plots in Gangtok. Other towns, being small in area, are covered by hardly 4 Cadastral sheets each. In preparing the land use map, information regarding each plot of land has been collected from the Land Registration Record (Survey and Settlement Department) in terms of their use, community wise ownership and height of the plots. The informations thus collected were plotted on the maps which, following the demarcation of respective land use types, were photographically reduced to obtain a composit picture of urban use for every town. The land use maps of Singtham and Rangpo however were prepared on the basis of the use of the buildings in the absence of cadastral maps since no such survey had been made for these two towns. Besides, the cadastral map of 1951 has been used especially for the information provided for the market area of Gangtok. An extensive field survey was made in 1984 under the guidance of Governmental officials and the local people. It supplemented data on the current pattern of land use in each town. These data have been incorporated in the final maps. The census area of 1981 has been considered here for the demographic analysis. For studying land use and morphology of the towns two types of area proposed respectively by Survey and Settlement department and Local Self Govt. department (Bazar department) have been taken into account (Table- 68). In the case of Gyalshing and Mangan the respective bazars and the developed area surrounding them have been taken into consideration because the survey and settlement map did not indicate the town boundary. These two sets of boun-
daries in terms of census and land use do not yet tally except in the case of Jorethang and Rangpo (Fig. 19 to 20).

Table 68
Area of the Towns in Sikkim (in hectares)

<table>
<thead>
<tr>
<th>Name of the Towns</th>
<th>Census Area $</th>
<th>Area for Landuse $</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gangtok</td>
<td>780.64</td>
<td>792.16</td>
</tr>
<tr>
<td>Gyalshing</td>
<td>5.15</td>
<td>8.57</td>
</tr>
<tr>
<td>Jorethang</td>
<td>38.39</td>
<td>38.39</td>
</tr>
<tr>
<td>Mangan</td>
<td>16.52</td>
<td>55.19</td>
</tr>
<tr>
<td>Namchi</td>
<td>41.95</td>
<td>68.87</td>
</tr>
<tr>
<td>Nayabazar</td>
<td>15.15*</td>
<td>10.65*</td>
</tr>
<tr>
<td>Rangpo</td>
<td>10.67</td>
<td>10.67*</td>
</tr>
<tr>
<td>Singtham</td>
<td>16.12*</td>
<td>10.12*</td>
</tr>
</tbody>
</table>

$ Based on house list map of 1981 Census
$ Based on Cadastral map, Survey & Settlement Deptt. Govt. of Sikkim
$ Based on Bazar map, Local Self Govt. and Housing Deptt.
* Approximate area

Before going into any details about the land use pattern it will be more worthwhile here to present a brief account about the shape of the towns.

SHAPE OF THE TOWNS

The external ground plan or the shape of the town is highly influenced by the site, communication lines and past history of the centres. Even for the towns on similar terrain one can rarely expect similar shape. In a mountaneous territory like Sikkim, the shape of the town is totally controlled by the topographical features as well as types of development including roads etc. following surface configuration, although human control over such physical barrier is not uncommon, particularly in the big towns where

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competition for land is very high. Like the physical factors, different historical events seem to have some influence in giving shape to the towns and this statement is particularly applicable to the location of key settlements like Gangtok and Namchi where the palace and the British Residency in the case of former and the residence of Kasi (local chief) for the latter have acted as deciding factors for their eventual growth.

The shape of the high land towns in this mountainous terrain is largely determined by the availability of flat or gently sloping surface with sunny aspect and the alignment of the roads. On the other hand, the shape of the valley towns is influenced by the contour or the valley sides, often giving rise to development of tiers at different altitudes. As a result the very impact of the valley has given round shape to Jorethang (Fig. 21), V shape to Rangpo (Fig. 25) and an elongated shape to Singtham and Nayabazar (Fig. 24 & 26). Gangtok represents an interesting case where the town spreads over an elongated ridge running and descending from north to south. The major roads run parallel to the ridge-crest and the settlement spreads along the same direction. Thus, Gangtok has developed an elongated shape, like a narrow V with its apex in the south and the arms of the V gradually widening in the north (Fig. 19). Another town, Namchi, spreads over the ridge-top and ultimately forms an irregular shape (Fig. 23). Mangan and Gyalshing having developed on the cliff with one side representing the deep river gorge have irregular shapes (Fig. 21 & 22). Like the towns of Sikkim, the shape of the other Eastern Himalayan towns vary widely due to the surface configuration over which they have developed.
URBAN LAND USE

Land use classification of the urban areas is based on various land use categories adopted by different planning organizations as well as urban geographers. In the regional context, urban land use in Sikkim has been classified into 15 major categories. These are as follows:

RESIDENTIAL
Residential quarters, guest houses, tourist lodges, rest house, palace and boarding houses.

COMMERCIAL
All kinds of shops including fair-priced shops, hotels and eating houses, transport agents and petrol pumps.

FACTORY/WORKSHOP
Factories and cottage industries, motor workshops and repair shops.

ADMINISTRATIVE
Government offices and press, post and telegraph offices, police station, fire brigade, banks, passenger's booking office.

DEFENCE
Cantonments and other defence camps.

EDUCATIONAL
Colleges, schools and other educational institutions including their hostels, staff quarters, play grounds and other establishment within the campus.

MEDICAL
Hospitals, health centres and veterinary hospitals including their staff quarters and other establishments.

PUBLIC UTILITIES
Public latrines and urinals, water tanks and pipelines, parking place and bus stands and graveyards and burial grounds.

RECREATIONAL
Stadium, play grounds, parks, gardens, community halls.
PLACES OF WORSHIP  Monasteries, temples, mosques, churches and gurudwara.

ROAD  All types of roads including footpath and steps and land reserved for road extension.

AGRICULTURE  All agricultural land including cardamom, fruits and vegetable gardens.

FOREST  All forest land including bamboo groves.

JHORA AND NALA  Streams, rivulets and drains.

OPEN SPACE  All vacant land including huge rock masses and dry river beds.

In Sikkim, the infant small towns (except Gangtok) covering barely 8 to 68 hectares (Table - 68) each exhibit a very simple land use pattern. The entire urban use is mostly confined to one or more pockets on the permissible ground offered by flat or gently sloping surfaces, irrespective of the location of the towns. Singtham, Rangpo, Jorethang and Nayabazar are valley towns, developed on small strips of flat river terraces (Fig. 21, 24, 25 & 26). The main road takes its course through the terrace and the settlements have developed along both sides of the road (Fig. 29, 32, 33 & 34). Intensity of land use decreases further away from the main road. The land use pattern in the highland towns -- Gangtok, Namchi, Mangan and Gyalshing -- is influenced by the ground stability, sunny face and other altitudinal aspects (Fig. 27, 28, 30 & 31). Gangtok, the capital town, spreading over an elongated ridge, covers an area of about 7.92 sq km where altitude varies between 1300 m to 2100 m (Fig. 27). The settlement has developed mainly on the western slope of the ridge where stable, gently sloping surface pe-
COMMERCIAL
ADMINISTRATIVE
EDUCATIONAL
MEDICAL
RECREATIONAL
PLACES OF WORSHIP
AGRICULTURE
FOREST
OPEN SPACE
ROAD

Fig 31

COMMUNITY WISE DISTRIBUTION OF LAND (1979)

Shutla
Lepcha
Nepali
Govt.

0 200 m
rmits all types of development including communication lines (road). On the contrary, the eastern slope offers steep, shadowed surface which is interrupted at several places by huge rock masses and the land for development is restricted to the sides of the major roads. The intensity of land use is very high on the southern part occurring around the market area and the major roads, and is mainly concentrated in the upper slope of the ridge. Below the ridge—top the increased run--off has resulted in a dissected surface which oppose all kinds of development. Thus the entire land use pattern is discontinuous in nature because abrupt changes of slope break the continuity of the land use zones (Fig. 27).

The functional character also influences the land use pattern of the towns which is quite evident, generally in the administrative headquarters like Gangtok, Namchi, Mangan and Gyalsching. In such towns the administrative, educational, medical and residential uses cover the major part of the developed land. On the other hand, in the non-administrative towns as, Singtham, Rangpo, Nayabazar and Jorethang, commercial and residential uses compose the major part of the developed area although in a few cases administrative use covers a considerable amount of the land.

In this connection it has to be noted that the process of urban development was very slow till 1975, when the state merged with the Indian Union, although most of the settlements started to appear in the beginning of the twentieth century. Prior to this, the land use pattern was very simple but since 1975 the rate of development has been rather fast which is reflected in the land use pattern, the latter becoming more complicated, particularly in Gangtok.
Characteristic Features of Land Use in Different Towns

In the urban areas of Sikkim about 32 to 80 per cent of the land is put under urban use or developed, and the rest of the land is occupied by the non-urban users like agriculture, forest, jhoras and Naldos (drains) and open spaces (Table - 69, 70 & 71). The proportional share of any category is directly related to the number of functional use and the total area of the towns. In the small towns, the residential together with two or three types of other uses cover the major portion of the built-up areas. Thus, the proportional share of land of one school or a hospital in a small town may be high in comparison to that of the other towns (Table - 71).

RESIDENTIAL USE

Out of the total developed land residential use covers about 18 to 54 per cent of the urban uses (Table - 71). However, the share of residential use is very low in the towns located on the high land, such as Gyalshing (28 per cent) and Mangan (18 per cent). On the contrary, the proportion of land used for residential purpose is generally high in the valley towns which is the highest in Nababazar (54 per cent). In the small towns the residences occur generally adjacent to the shopping-rows and sometimes, around the school, hospital, office buildings and official quarters (Fig. 28 - 34). As a general rule, the residences are built at the rear portion of the shops and the upper storey is always used as residence. Besides, in all the administrative towns the Government residential quarters make a common sight and at the same time it is also common in some of the non-administrative towns. In spite of
### Table 69
Land Use Pattern in the Urban Areas of Sikkim: 1976/77 -- 1981/82
(percentage to the total area)

<table>
<thead>
<tr>
<th>Land Use Category</th>
<th>Gangtok</th>
<th>Gyalshing</th>
<th>Jorethang</th>
<th>Mangan</th>
<th>Namchi</th>
<th>Naya bazar</th>
<th>Rangpo</th>
<th>Singtham</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial</td>
<td>0.52</td>
<td>10.30</td>
<td>3.41</td>
<td>6.75</td>
<td>1.13</td>
<td>5.53</td>
<td>13.81</td>
<td>25.32</td>
</tr>
<tr>
<td>Factory/Workshop</td>
<td>0.35</td>
<td>--</td>
<td>3.45</td>
<td>--</td>
<td>--</td>
<td>1.86</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Administrative</td>
<td>1.26</td>
<td>1.30</td>
<td>16.23</td>
<td>11.24</td>
<td>7.10</td>
<td>0.85</td>
<td>4.95</td>
<td>6.06</td>
</tr>
<tr>
<td>Defence</td>
<td>13.09</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Educational</td>
<td>1.22</td>
<td>7.30</td>
<td>2.89</td>
<td>22.53</td>
<td>14.05</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Medical</td>
<td>0.36</td>
<td>19.48</td>
<td>1.92</td>
<td>2.91</td>
<td>5.23</td>
<td>--</td>
<td>0.19</td>
<td>--</td>
</tr>
<tr>
<td>Public Utilities</td>
<td>0.39</td>
<td>--</td>
<td>--</td>
<td>0.16</td>
<td>0.06</td>
<td>--</td>
<td>0.29</td>
<td>--</td>
</tr>
<tr>
<td>Recreational</td>
<td>0.56</td>
<td>--</td>
<td>1.78</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>0.47</td>
</tr>
<tr>
<td>Places of Worship</td>
<td>0.79</td>
<td>0.03</td>
<td>0.28</td>
<td>--</td>
<td>0.47</td>
<td>0.11</td>
<td>0.53</td>
<td>1.80</td>
</tr>
<tr>
<td>Roads &amp; Reserved</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agricultural</td>
<td>10.81</td>
<td>--</td>
<td>13.81</td>
<td>11.06</td>
<td>30.77</td>
<td>0.30</td>
<td>3.86</td>
<td>--</td>
</tr>
<tr>
<td>Forest</td>
<td>0.49</td>
<td>11.20</td>
<td>0.07</td>
<td>2.40</td>
<td>7.20</td>
<td>28.49</td>
<td>--</td>
<td>8.52</td>
</tr>
<tr>
<td>Jhora/Nala</td>
<td>2.86</td>
<td>0.70</td>
<td>0.27</td>
<td>3.85</td>
<td>0.37</td>
<td>0.51</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Open Space</td>
<td>31.96</td>
<td>8.29</td>
<td>19.86</td>
<td>11.25</td>
<td>7.87</td>
<td>41.16</td>
<td>47.85</td>
<td>14.43</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: Survey & Settlement Deptt. Govt. of Sikkim.


### Table 70
Major Urban Land Use in Sikkim: 1977-82
(in percentage)

<table>
<thead>
<tr>
<th>Name of the Town</th>
<th>Land Use</th>
<th>Agriculture</th>
<th>Forest</th>
<th>Drain/Jhora</th>
<th>Open Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gangtok</td>
<td>45.66</td>
<td>10.81</td>
<td>8.49</td>
<td>2.86</td>
<td>31.96</td>
</tr>
<tr>
<td>Gyalshing</td>
<td>79.81</td>
<td>--</td>
<td>11.20</td>
<td>0.70</td>
<td>8.29</td>
</tr>
<tr>
<td>Jorethang</td>
<td>66.19</td>
<td>13.61</td>
<td>0.07</td>
<td>0.27</td>
<td>19.86</td>
</tr>
<tr>
<td>Mangan</td>
<td>71.64</td>
<td>11.06</td>
<td>2.40</td>
<td>3.85</td>
<td>11.25</td>
</tr>
<tr>
<td>Namchi</td>
<td>53.79</td>
<td>30.77</td>
<td>7.20</td>
<td>0.37</td>
<td>7.87</td>
</tr>
<tr>
<td>Naya bazar</td>
<td>29.54</td>
<td>0.30</td>
<td>28.49</td>
<td>0.52</td>
<td>41.16</td>
</tr>
<tr>
<td>Rangpo</td>
<td>48.29</td>
<td>3.86</td>
<td>--</td>
<td>NA</td>
<td>47.85</td>
</tr>
<tr>
<td>Singtham</td>
<td>77.05</td>
<td>--</td>
<td>--</td>
<td>NA</td>
<td>22.95</td>
</tr>
</tbody>
</table>

Source: Survey & Settlement Deptt. Govt. of Sikkim.

NA: Not available
## Table 71

Land Use Pattern in the Urban Areas of Sikkim: 1976/77 -- 1981/82
(percentage to the Developed Land *#

<table>
<thead>
<tr>
<th>Land Use Category</th>
<th>Gangtok</th>
<th>Gyalshing</th>
<th>Jorethang</th>
<th>Mangan</th>
<th>Namchi</th>
<th>Naya bazar</th>
<th>Rangpo</th>
<th>Singhtham</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>46.84</td>
<td>26.14</td>
<td>44.96</td>
<td>18.54</td>
<td>39.25</td>
<td>54.11</td>
<td>32.64</td>
<td>38.91</td>
</tr>
<tr>
<td>Commercial</td>
<td>1.15</td>
<td>12.79</td>
<td>5.13</td>
<td>9.96</td>
<td>2.08</td>
<td>10.40</td>
<td>29.60</td>
<td>32.86</td>
</tr>
<tr>
<td>Factory/Workshop</td>
<td>0.77</td>
<td>--</td>
<td>5.19</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>3.85</td>
<td>--</td>
</tr>
<tr>
<td>Administrative</td>
<td>2.78</td>
<td>1.28</td>
<td>24.42</td>
<td>14.93</td>
<td>13.11</td>
<td>2.63</td>
<td>10.04</td>
<td>7.89</td>
</tr>
<tr>
<td>Defence</td>
<td>28.82</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Educational</td>
<td>4.02</td>
<td>9.07</td>
<td>4.35</td>
<td>29.92</td>
<td>25.94</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Medical</td>
<td>0.78</td>
<td>24.19</td>
<td>2.89</td>
<td>3.86</td>
<td>9.66</td>
<td>--</td>
<td>0.39</td>
<td>--</td>
</tr>
<tr>
<td>Public Utilities</td>
<td>0.86</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>0.30</td>
<td>0.20</td>
<td>0.38</td>
<td>--</td>
</tr>
<tr>
<td>Recreational</td>
<td>1.23</td>
<td>--</td>
<td>2.86</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>0.61</td>
<td>--</td>
</tr>
<tr>
<td>Places of Worship</td>
<td>1.73</td>
<td>0.04</td>
<td>0.42</td>
<td>--</td>
<td>0.87</td>
<td>0.37</td>
<td>1.10</td>
<td>2.34</td>
</tr>
<tr>
<td>Roads &amp; Reserved</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Area for Roads</td>
<td>11.02</td>
<td>23.61</td>
<td>9.55</td>
<td>18.93</td>
<td>8.11</td>
<td>22.40</td>
<td>23.38</td>
<td>17.01</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: Survey & Settlement Deptt. Govt. of Sikkim.

* Excluding agriculture, forest, open space, nala/jhora etc.

of Gangtok where, in spatial dimension, the residential use takes a dominant role.

As regards housing, the traditional habits are still in vogue where majority of the private houses are made of wood walls with metallic roof and most of them are one storied. Multi-storied brick buildings are very small in number and they are mainly concentrated in the shopping areas or appear as government quarters. Density of population per residential houses varies between 4.7 to 5.3 persons per house which is almost equal to that of the rural areas (5.1 persons). During the last decade (1971-81), the density of population for residential houses has changed noticeable when it has decreased in most of the towns except in Gangtok and Singtham, the two large settlements (Table - 72). Furthermore, an increase in the percentage of land used for residential purpose is noticeable during the last few years in each and every towns (Table - 73).

According to a survey undertaken for this purpose (1984), most of these residential extensions have eaten up open spaces, forest and agricultural lands (Fig. 27 - 37). In some cases the residential extension crosses the present boundary of the town as it has happened in Singtham and Rangpo. As a matter of fact, the intensity of residential use is going rather fast by way of filling up the open spaces within the residential areas. At the same time the traditional buildings are gradually being replaced by brickbuilt modern houses.
Table 72

Residential Density in the Urban Areas of Sikkim: 1971 & 81
(Persons per occupied residential house)

<table>
<thead>
<tr>
<th>Name of the Town</th>
<th>1971</th>
<th>1981</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gangtok</td>
<td>4.85</td>
<td>5.29</td>
</tr>
<tr>
<td>Gyalshing</td>
<td>5.24</td>
<td>4.87</td>
</tr>
<tr>
<td>Jorethang</td>
<td></td>
<td>4.65</td>
</tr>
<tr>
<td>Mangan</td>
<td>6.13</td>
<td>5.16</td>
</tr>
<tr>
<td>Namchi</td>
<td>6.67</td>
<td>5.33</td>
</tr>
<tr>
<td>Nayabazar</td>
<td>5.29</td>
<td>5.12</td>
</tr>
<tr>
<td>Rangpo</td>
<td>7.28</td>
<td>4.51</td>
</tr>
<tr>
<td>Singtam</td>
<td>4.47</td>
<td>5.05</td>
</tr>
<tr>
<td>TOTAL</td>
<td>5.08</td>
<td>5.18</td>
</tr>
</tbody>
</table>

Source: Census 1971 and 1981
* In 1971 Nayabazar and Jorethang was treated as twin town.

Table 73

Land Use Pattern in the Urban Areas of Sikkim: 1984
(percentage to the total area)

<table>
<thead>
<tr>
<th>Land Use Category</th>
<th>Gangtok</th>
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<th>Jorethang</th>
<th>Mangan</th>
<th>Namchi</th>
<th>Nayabazar</th>
<th>Rangpo</th>
<th>Singtam</th>
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Source: Survey & Settlement Deptt. Govt. of Sikkim.
4. Panoramic view (Gangtok)

5. High rise buildings (Gangtok)

6. High rise buildings (Singtham)
COMMERCIAL USE

In the urban areas of Sikkim, land used for commercial functions is widely variable having taken up, so far, 1.2 to 32.9 per cent of the developed area of the urban landscape. In general, however, land devoted for this particular use is small in the administrative towns while it is significantly much higher in the non-administrative towns (except Jorethang) where commercial use covers about 18 to 33 per cent of the developed land (Table - 71). As a rule, the demarcated area for the *hat* (weekly market) included in the category of land used for commercial purpose will definitely raise the actual proportion of land for commercial uses which measured on the basis of percent shops forms a much smaller proportion of the total urban land. The commercial area appears as a square pocket in Gyalshing and Jorethang but in the other towns it stretches along both sides of the main road, giving rise to linear shape.

The indigenous shopping area consists of traditional buildings, made of wood, and most of them are one storied. They are nevertheless being gradually replaced by the multistoried modern buildings, some of them being more than four storied, which is noticeable in the large town like Gangtok, Singtham and Jorethang where the upper floors of the buildings are used both for offices and residences. During the survey mentioned above very slight increase in commercial use (Table - 73) was noted and this has mainly taken place in the vacant land or in the residential areas. On the whole, more and more land is coming under commercial use in all the towns.

ADMINISTRATIVE USE

In the urban areas land used for administrative functions similarly varies widely, ranging from 1.3 to 24.4 per cent of the total
7. High class resident (Gangtok)

8. Town from the river bed (Jorethang)

9. M.G. Marg (Gangtok)
developed area (Table - 71) and this is very scattered in appearance. It is interesting to note here that a good amount of the land in some of the non-administrative towns is used for this purpose though in the capital town it comprises a very small portion of the total urban area. Recently, the proportional share for administrative use has risen in most of the towns, particularly in the administrative towns. In Gangtok about 28.8 per cent of the land is under defence (Table - 71) most of which lies on the higher northern part of the ridge (Fig. 27).

OTHER USES

Besides the three major types of land use, namely residential, commercial and administrative, education and medical services take up a good amount of the urban land in some of the towns when it is totally absent in some other towns (Table - 71). Among the towns, land used for educational function in Namchi (25.9 per cent) and Mangan (29.9 per cent) and for medical function in Gyalshing (24.2 per cent) is noteworthy. The share of land under other uses like, factory and workshop, public utilities, recreational and places of worship is rather insignificant in some of the towns and is totally absent in some others (Table - 71). In contrast, land used for roads and kept reserved for roads to be constructed in future, covers about 8 to 23.8 per cent of the developed land (Table - 71) of the urban areas barring the case of ridge towns like Namchi and Gangtok where the percentage is comparatively low. There are, however, instances of encroachment of the areas kept reserved for roads by commercial activities of the towns, mainly in and around the shopping centres.
AGRICULTURAL USE

A good amount of land is put under agricultural use even in some of the important towns like Gangtok (10.6 per cent), Jorethang (13.6 per cent) and Namchi (30.8 per cent) while it is totally absent in Singtham and Gyalshing (Table - 70). Agricultural lands mainly occupy the periphery of the towns or occur along the developed areas. Rice, maize and large cardamom are the important crops in urban areas but large cardamom is mainly cultivated in the highland towns. However, a good amount of this agricultural land has been converted into residential areas or is in the process of being used for other urban functions.

FOREST

The forest and bamboo covers a sizeable amount of urban land in some of the towns, (Table -69) namely Nayabazar, where about 28.5 per cent of the land is occupied by the forests. A fair amount of forest land is still present in Gangtok, Gyalshing and Namchi (Table -73). In most of the cases bamboo groves occur along the jhórás while forests appear in isolated pockets. In the urban areas, the forest land is gradually being converted into other uses but in a few cases the forests have been planted in the vacant lands, as in Gangtok and Rangpo (Fig. 28, 30, 32, 35, 36 & 37).

OPEN SPACE

About 7.9 to 47.9 per cent of the urban land still remains vacant (Table - 69) which, in the valley towns, constitute the dry river bed. In the highland towns the distribution of vacant land is scattered in nature, represented mostly by steep slope, land strips along the jhórà and huge rock masses. However, the increasing demand
of land and the mounting pressure of population giving rise to the
price of land have led to the development of these vacant lands in
spite of the fact that cost of reclamation of such land is very
high. Besides these vacant land, open space is still present and
they are distributed in small pockets throughout the urban
scape.

INTERNAL STRUCTURE OF THE TOWNS

The internal structure of the urban areas is highly complex and
it is more complex in the highlands. Towns are structurally het-
regenous, their buildings vary in function, age, size, shape and their
population vary in distribution, socio-economic status and in ra-
cial origin. In course of urban growth there is a tendency for
different functions to occupy different areas within the towns so
that the residential, commercial or administrative activities get-
ting shorted out became the dominant functions in different parts
of the towns. "The arrangement and layout of the buildings and the
function or use of land and buildings in a town are collectively
described as towns morphology. In the study of urban morphology,
we are primarily concerned with the use as each parcel of land ac-
commodate a specific type of function and in course of urban deve-
lopment, certain type of land use became segregated while others
are brought together in to close association of themselves.

Physical and man made characteristics of site, origin
and age of the nucle setlement, emerging functional character and
size and distribution of the population form the important compo-
nent of urban morphology. In course of time this is further influ-

5 Daniel, P. and Hopkinson, M. The Geography of Settlement. Edinburgh, Oliver and
Lloyd, 1979. p 84
enced by the economic activities and functional needs of the surr-
ounding rural areas - the hinterland - as the support of the towns
depends much on the service it offers not only to its own popula-
tion but also to a wider area far beyond the town's municipal or
administrative boundary. And lastly, the internal structure of the
town is highly influenced by the land ownership pattern as the total
land does not belong to any government/urban authorities in
Sikkim. A good amount of land is owned by a number of private par-
ties of different communities and the study of urban morphology is
primarily concerned with the ground plan or use of the plots on
the ground.

In Sikkim, the internal structure or the morphology
of the town is very simple as they perform very simple functions.
The major part of the developed area is occupied by the residen-
tial buildings together with the shopping-cum-residential build-
ings, schools and hospitals [Fig. 28, 30 & 32-37]. In the district
towns, the administrative offices and their staff quarters occupy a
good amount of land. The distribution of such functional areas is
highly influenced by the nature of terrain over which the settle-
ment develops and is controlled by such factors as the cost of im-
provement when the desirability for various uses varies with conto-
ure, gradient and elevation. The site (physical characteristic of
location) and situation (relationship of a particular site to oth-
er parts of the area) together influence the morphological charac-
ter of the land use where dissected topography discourages unint-
errupted use of land. In general, urban use occurs in several deta-

Breuse, G. Urbanization in Newly Developed Countries. New Delhi, Prentice Hall
1978. p 102
10. Weekly Market Place (Singtham)

11. Lal Market (Gangtok)

12. Market Day (Gyalshing)
ched, small pockets and is found usually strung along the major roads. The size and emerging functional character of these small towns encourage imperfect morphological zones. As a result, diversity in the land use pattern can not be traced though occupational structure is highly diversified. The structure of the small towns (other than Gangtok) consists of such diversified areas as commercial-cum-residential areas, residential areas, areas with schools, hospital and sometime administrative buildings together with their staff quarters.

The segregation, in terms of land use, function and population, is closely related to the growth of the centres. In terms of the growth history of these small towns, there are three distinct phases:

(i) An early period (between 1889 to 1950) when modern means of transport just penetrated into some of the important centres like Gangtok, Singtham and Rangpo. During this period the activities of these places remained highly restricted to their shopping areas when shopping-cum-residential houses were arranged along the both sides of the main road with only a few residential houses occurring here and there behind the main complex. The picture was, however, quite different in the princely state capital of Gangtok where the structure of the town consisted of the Palace and the residences of the feudal lords (Kazi), the school, the hospital and the shopping-cum-residential area.

(ii) During the second phase, the development started with the introduction of Economic plan (1954) when the towns were connected with motor services. On the other hand, the commodity flow became unidirectional due to the close of border trade with Tibet in 1962. The stoppage of border trade and transport development stimulated
the growth of the towns, particularly those located in the southern part, such as Singtham, Rangpo, Jorethang and Nayabazar. During this period some of the centres— for instance, Mangan, Gyalshing and Namchi— became district headquarters with the final division of the state in 1963. This phase further witnessed the horizontal expansion of the towns when a number of shops, administrative institutions and other functional organizations like schools, hospitals, banks etc. slowly came into existence with the introduction of the Economic Plan in 1954.

(iii) Finally, the recent phase begins with Sikkim's merger of the Indian Union in 1975, when the developmental works started at a faster rate. In this new political and economic set up, many governmental offices and their residential quarters came up and as space were not adequate to house the growing activities, a large number of buildings were built by private organizations to provide accommodation for different functions. The growth of population was very high during the last decade which further increased the demand for residential or other types of accommodation. In due course residential areas sprung up along the major roads leading to the shopping area, and also around the important building complexes like schools, hospital and government offices followed by non-residential establishments and the urban expansion, at some instances, crossed the original boundary of the town. The intensity of land use is witnessed both in residential and commercial sectors of each and every town during this period. At present, vertical extension of buildings is a common feature of the urban scenery, mainly in the shopping area.

The process of urban expansion of the Himalayan towns is quite different from that of the towns located on the plains.
13. Tire wise residential expansion (Gangtok)

14. Recent development beyond town boundary (Namchi)
Urban expansion has taken place both in the horizontal and vertical direction over the three-dimensional topography. In the case of horizontal expansion, growth follows the major roads where the roads follow the contours of the land. In course of development the entire slope intervening between two roads running at different levels gets filled up in the first phase. In this way town extends vertically in a high land topography. The increasing demand for accommodation and the higher cost of land reclamation increase the intensity of use of the urban land which ultimately has resulted in the vertical extension of urbanscapes, particularly along the major roads. The height of the buildings occasionally violates the limits set by the government.

In Sikkim, the impact of functional character on the growth and development of the internal structure of the towns is undeniable. As for instance, the urbanscape in the administrative towns is characterised by an indigenous shopping area which is surrounded by residential houses when other establishments like hospital, school and district level offices and their staff quarters have developed in isolated manner. The non-administrative towns make a contrasting scene where the indigenous shopping area is surrounded by residential houses and occasionally the administrative offices are located within the shopping area (Fig. 28, 30 & 32 to 37).

In course of urban development there is a tendency for certain types of functions like residential, commercial etc. or certain groups of population in terms of income, race or religion to get segregated and became concentrated in different parts of the towns. In Sikkim, segregation has just started to surface only in Gangtok and it is totally absent in the other small towns.
15. Poor class residences (Rangpo)

16. Poor class residences (Gangtok)